

CLAIMS

I/we claim:

1. A system for wirelessly exchanging communications with at least one mobile unit, the system comprising:

- a first base station unit coupled to a network;

- a second base station unit coupled to the network, wherein the first and second base station units are configured to communicate wirelessly with the mobile unit under a Bluetooth protocol and to automatically handoff the mobile unit from the first base station unit to the second base station unit;

wherein the first and second base station units are configured to:

- use a low power class capability to inquire whether Bluetooth compatible devices are within a near communications range;

- use a medium power class capability to inquire whether Bluetooth compatible devices are within an intermediate communications range;

- use a high power class capability to inquire whether Bluetooth compatible devices are within a far communications range;

- store at least one record that identifies any Bluetooth compatible devices are within the near, intermediate and far communications ranges;

- identify which devices are base station units capable of accepting the mobile unit during a handoff; and

- update the at least one record to reflect changes in base station units capable of accepting the mobile unit during a handoff.

2. The system of claim 1, further comprising a system controller coupled to the first and second base station units and to the network, wherein the system controller is configured to mediate communications between the first and second base stations and the network,

wherein the low, medium and high power classes include 0 dB, 4 dB and 20 dB power classes, respectively,

wherein identifying which devices are base station units capable of accepting the mobile unit during a handoff includes employing a Bluetooth service discovery protocol to identify services associated with identified devices; and

wherein updating the at least one record includes again using the low, medium and high power class capabilities to inquire whether Bluetooth compatible devices are within the near, intermediate and far communications ranges, and updating the at least one record when a rediscovery period has expired.

3. The system of claim 1 wherein updating the at least one record includes:

sending periodic signals to neighboring base station units, wherein the periodic signals include information identifying the base station unit that sends the periodic signals;

receiving periodic signals from at least one neighboring base station unit;

determining an identity of the one neighboring base station unit based on the received periodic signals; and

updating the at least one record if a periodic signal is not received from a previously neighboring base station.

4. A method of creating a list of neighboring base station units in a wireless communications network, wherein at least one mobile unit communicates with at least a portion of the network, the method of creating the list of neighboring base station units comprising:

at a stationary base station unit in the communications network, sending at least one inquiry signal to neighboring wireless devices;

at the stationary base station unit in the communications network, receiving at least one response signal from at least one neighboring base station unit in the communications network, wherein the one neighboring base station unit is stationary;

at the stationary base station unit in the communications network, identifying the one neighboring base station unit based in part on the received response signal, wherein identifying the at least one neighboring base

station unit is done without involvement of the mobile unit and without involvement of a system controller for the communications network;
and

at the stationary base station unit in the communications network, providing a stored neighbor list that identifies the one neighboring base station unit in the communications network.

5. The method of claim 4 wherein the base station unit and the neighboring base station unit are both Bluetooth enabled base station units,
wherein sending at least one inquiry signal includes wirelessly sending a Bluetooth inquiry signal with respect to at least two different power classes,
wherein identifying the one neighboring base station unit includes employing a Bluetooth service discovery protocol to identify two or more neighboring base station units, and
wherein providing a stored neighbor list includes locally storing a list categorizing the identified neighboring base station units into at least two different categories based on the two different power classes.

6. The method of claim 4 wherein sending at least one inquiry signal and receiving a response signal includes wirelessly exchanging signals under a Bluetooth protocol.

7. The method of claim 4 wherein identifying the one neighboring base station unit includes employing a Bluetooth service discovery protocol.

8. The method of claim 4 wherein providing a stored neighbor list includes locally storing a list categorizing identified neighboring base station units into at least two different categories.

9. The method of claim 4 wherein sending at least one inquiry signal includes using a low power class capability and a high power class capability to inquire whether wireless devices are within a near communications range and a far communications range, respectively.

10. The method of claim 4, further comprising automatically updating the stored neighbor list to reflect changes in neighboring base station units, and wherein sending at least one inquiry signal and receiving a response signal is performed wirelessly between the base station unit and the neighboring base station unit.

11. The method of claim 4, further comprising updating the stored neighbor list to reflect changes in neighboring base station units by again sending at least one inquiry signal and receiving a response signal, and updating the stored neighbor list, when a predetermined time period has expired.

12. The method of 4, further comprising updating the stored neighbor list to reflect changes in the one neighboring base station unit, wherein updating the stored neighbor list comprises:

wirelessly sending periodic signals to neighboring base station units, wherein the periodic signals include information identifying the base station unit; wirelessly receiving periodic signals from the one neighboring base station unit and another neighboring base station unit; determining an identity of the another neighboring base station unit based on the received periodic signals; and updating the stored neighbor list based on the received signal from the another neighboring base station.

13. The method of claim 4, further comprising receiving periodic signals from the one neighboring base station unit, and updating the stored neighbor list if a periodic signal is not received from the one neighboring base station.

14. The method of claim 4, further comprising determining whether a certain time period associated with at least a portion of the stored neighbor list has expired, and if so, then again sending at least one inquiry signal, receiving a response signal, and updating the stored neighbor list.

15. The method of claim 4, further comprising providing periodic signals to a system controller, and updating the stored neighbor list based on a command signal received from the system controller.

16. . . The method of claim 4, further comprising determining whether a certain time period has expired, and if so, then again sending at least one inquiry signal, receiving a response signal, and updating the stored neighbor list.

17. The method of claim 4, further comprising receiving a command signal from a system controller coupled to the base station unit, and in response thereto, again sending at least one inquiry signal, receiving a response signal, and updating the stored neighbor list.

18. The method of claim 4 wherein the stationary base station unit is stationary relative to a moving vehicle.

19. The method of claim 4 wherein providing a stored neighbor list includes locally storing a list categorizing the identified neighboring base station units into at least one category.

20. A computer-readable medium whose contents cause a fixed short-range wireless communications switch to perform a peer-to-peer method to provide a neighbor list for neighboring and fixed short-range wireless communications switches in a communications network, wherein at least one mobile unit communicates with at least a portion of the communications network, the method comprising:

- at the fixed short-range wireless switch in the communications network,
sending at least one signal to neighboring wireless devices, wherein
sending the signal is done without assistance of the mobile unit and
without the assistance of a system controller for the communications
network;

- at the fixed short-range wireless switch in the communications network,
receiving a response signal from at least one neighboring short-range
wireless switch;

- at the fixed short-range wireless switch in the communications network,
identifying the one neighboring short-range wireless switch based on
the received response signal, wherein identifying the one neighboring
base station is done without assistance of the mobile unit or system
controller, and wherein the one neighboring short-range wireless switch
is fixed; and

providing a neighbor list that identifies the one neighboring short-range wireless switch..

21. The computer-readable medium of claim 20 wherein the computer-readable medium is a logical node in a computer network receiving the contents.

22. The computer-readable medium of claim 20 wherein the computer-readable medium is a computer-readable disk.

23. The computer-readable medium of claim 20 wherein the computer-readable medium is a data transmission medium transmitting a generated data signal containing the contents.

24. The computer-readable medium of claim 20 wherein the computer-readable medium is a memory of a computer system.

25. A computer-readable medium containing a data structure for use by a base station unit in a communications network, the data structure comprising:

at least one record stored at the base station unit, wherein each record comprises:

a Bluetooth device address for a neighboring base station unit, wherein the neighboring base station unit may communicate wirelessly under a Bluetooth protocol to the base station unit;

a category of the neighboring base station unit; and

at least one time and date field.

26. The computer-readable medium of claim 25 wherein each record further comprises an expiration time value.

27. The computer-readable medium of claim 25 wherein the time and date field includes an initialization time when the neighboring base station unit was first discovered, and a rediscovery time when a presence of the neighboring base station unit was most recently confirmed.

28. A computer-readable medium containing a data structure for use by a base station unit in a short-range communications network, the data structure comprising:

- at least one record stored at the base station unit in the short-range communications network, wherein each record comprises:
 - a unique identifier for a neighboring base station unit, wherein the neighboring base station unit may communicate wirelessly under a short-range wireless protocol to the base station unit, wherein the short-range wireless protocol permits the neighboring base station unit to communicate wirelessly with an effective range of less than 500 meters;
 - a category of the neighboring base station unit; and
 - at least one time and date field.

29. In a picocellular communications network, wherein at least one mobile unit communicates with at least a portion of the network, an apparatus comprising:

- a stationary wireless network access point coupled to the picocellular communications network, wherein the base station unit includes a memory and is configured to:
 - send at least one inquiry signal to neighboring wireless devices;
 - receive at least one response signal from at least one neighboring network access point in the picocellular communications network;
- identify the one neighboring network access point based in part on the received response signal, wherein identifying the at least one neighboring network access point is done without involvement of the mobile unit and without involvement of a system controller for the picocellular communications network, and wherein the at least one neighboring network access point is stationary; and
- provide a neighbor list stored in the memory, wherein the neighbor list identifies the one neighboring network access point in the picocellular communications network.

30. The apparatus of claim 29, further comprising:
a system controller coupled to the network access point;
a gateway router coupled to the system controller and the network access point, wherein the network access point forms at least a part of a first subnet;
a backbone router coupled to the gateway router and to the neighboring network access point, wherein the neighboring network access point forms at least a part of a second subnet; and
a point of presence coupled to the backbone router, wherein the point of presence and the mobile unit form at least part of a mobile unit virtual subnet.

31. The apparatus of claim 29 wherein the neighbor list identifies a plurality of neighboring network access points, wherein the plurality of network access points are segregated into at least two quantized levels.

32. The apparatus of claim 29 wherein the network access point is further configured to automatically update the stored neighbor list to reflect changes in neighboring network access points.

33. The apparatus of claim 29 wherein the network access point is further configured to wirelessly send the inquiry signal and wirelessly receive the response signal.

34. The apparatus of claim 29 wherein the neighbor list includes a predetermined time period associated with the stored neighbor list, and wherein the network access point is further configured to determine when the time period has expired, and if so, then again send at least one inquiry signal, receive a response signal, and update the stored neighbor list.

35. The apparatus of claim 29 wherein the neighbor list includes a predetermined time period associated with the one neighboring network access point, and wherein the network access point is further configured to determine when the time period has expired, and if so, then again send at least one inquiry signal, receive a response signal, and update the stored neighbor list.

36. The apparatus of claim 29 wherein the network access point is further configured to send the inquiry signal and receive the response signal via a wired connection between the network access point and the neighboring network access point.

37. The apparatus of claim 29 wherein the network access point is configured to send the inquiry signal at a low power level and a high power level, wherein the network access point includes power measurement circuitry and is further configured to classify neighboring base stations into two or more categories based on a signal strength of received response signals.

38. The apparatus of claim 29 wherein the network access point is further configured to periodically send the inquiry signal, receive response signals, and update the stored neighbor list.

39. The apparatus of claim 29 wherein the network access point is further configured to receive a command signal from a system controller coupled to the network access point, and in response thereto, send the inquiry signal, receive response signals, and update the stored neighbor list.

40. The apparatus of claim 29 wherein the network access point has a fixed relative position.

41. The apparatus of claim 29 wherein the network access point is stationary relative to a movable vehicle.

42. In a short-range wireless communications network, wherein at least one mobile unit communicates with at least a portion of the network, an apparatus comprising:

fixed means for providing short-range wireless communications within the communications network, wherein the means for providing short-range wireless communications comprises:

means for sending at least one signal to neighboring wireless devices, wherein sending the signal is done without assistance of the mobile unit and without the assistance of a system controller for the communications network;

means for receiving a response signal from at least one neighboring short-range wireless network node;

means, coupled to the means for receiving, for identifying the one neighboring short-range wireless network node based on the received response signal, wherein identifying the one neighboring short-range network node is done without assistance of the mobile unit or system controller, and wherein the neighboring short-range network node is fixed; and

means for providing a neighbor list that identifies the one neighboring short-range network node.

43. The apparatus of claim 42 wherein the means for sending at least one inquiry signal and the means for receiving a response signal include wirelessly exchanging signals under a Bluetooth protocol.

44. The apparatus of claim 42 wherein the means for providing further comprises means for locally storing a list categorizing identified neighboring short-range network nodes into at least two different categories.

45. The apparatus of claim 42 wherein the means for providing further comprises means for sending at least one inquiry signal using a low power class capability and a high power class capability to inquire whether wireless devices are within a near communications range and a far communications range, respectively.

46. The apparatus of claim 42 wherein the fixed means for providing short-range wireless communications provides wireless communications under a standard protocol for a range up to about 500 meters.

47. A method of creating a list of neighboring base station units in a wireless communications network, wherein at least one mobile unit communicates with at least a portion of the network, the method of creating the list of neighboring base station units comprising:

at a base station unit in the communications network, receiving communication signals from one or more mobile units in the communications network during at least one communications session;

at the base station unit in the communications network, handing off the mobile units to one or more neighboring base station units;

at the base station unit in the communications network, exchanging information with one or more neighboring base station units;

at the base station unit in the communications network, recording the presence of the one or more neighboring base station units, without involvement of a wireless communications network controller and not during the communications session; and

at the base station unit in the communications network, providing a stored neighbor list that identifies the one or more neighboring base station units in the communications network.

48. The method of claim 47 wherein receiving communication signals includes employing a Bluetooth communication protocol, and wherein the method further comprises transmitting the stored neighbor list to at least one of the neighboring base station units.